

January 2, 2020

Arthur Burbank
USDA Forest Service
4350 South Cliffs Dr.
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**Subject: Biological Selenium Removal Treatment Technology
 Water Treatment Pilot Study
 November 2019 Progress Report**

Dear Art,

This progress report summarizes key activities in November 2019 associated with Phase 2 of the Water Treatment Pilot Study located near Hoopes Spring. This Pilot Study is being conducted as part of the Smoky Canyon Mine Remedial Investigation/Feasibility Study (RI/FS) to provide information on the effectiveness of the active biological treatment system in removing selenium and other COPCs from South Fork Sage Creek Springs and Hoopes Spring.

Work related to the approved Phase 2 Pilot Study continues at the site in accordance with the *Final Phase 2 Pilot Study Work Plan and Sampling and Analysis Plan, Ultra-Filtration/Reverse Osmosis and Biological Selenium Removal Fluidized Bed Bioreactor Treatment Technology* (Phase 2 WP/SAP).

Identification of Deliverables and Data Transmittals

There were no outstanding deliverables or transmittals for the month of November. At the time of this report, we have received laboratory data for Weeks 90 and 92. Preliminary laboratory data are presented in Table 1. The field data for the Weeks 90 and 92 sampling events is summarized in Table 2.

Completed Activities

The following activities associated with the Phase 2 Pilot Study were completed in November 2019:

- Continued system operation and treatment of selenium.

The Treatment System Pilot (TSP) influent total selenium concentration for Week 90 was 161 ug/L and Week 92 was 174 ug/L. The Treatment System Pilot effluent total selenium concentration for Week 90 was 26.0 ug/L and Week 92 was 29.9 ug/L. The average removal efficiency for November was approximately 83.3% for total selenium removal.

The average flow of the TSP for the month of November was 1,643 gpm. Since full scale operations began in early December 2017 approximately 1.617 billion gallons of impacted water has been treated. The mass of selenium removed from December 2017 through November 2019



is approximately 1,695 pounds.

Upcoming Activities

The following activities associated with the Phase 2 Pilot Study are planned through December 2019:

- Continue system monitoring in accordance with the sampling and analysis plan.

Please contact me if there are questions regarding this monthly progress report.

Sincerely,

Jeffrey Hamilton
Environmental Engineer

cc:

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Table 1
Laboratory Results Focused Analyte List

Hoopes Springs Water Treatment Plant Pilot Study
Phase 2, Performance Monitoring

		Week 90			Week 92		
Station >>		Influent	Ultra Filtration Backwash	Effluent	Influent	Ultra Filtration Backwash	Effluent
Sample ID >>		SC1119-LSSHS-IN001	SC1119-LSSHS-UFB001	SC1119-LSSHS-EF001	SC1119-LSSHS-IN002	SC1119-LSSHS-UFB002	SC1119-LSSHS-EF002
Date >>		11/6/2019			11/20/2019		
Analyte	Units						
General Chemistry							
Ammonia, as N	mg/L	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U
Biochemical Oxygen Demand	mg/L	2 U	2 U	2 U	2 U	2 U	2 U
TSS	mg/L	2 U	2 U	3 J	2 U	2 U	2 U
Nutrients							
Nitrate, as N	mg/L	0.36	0.13	0.34	0.36	0.21	0.9
Sulfide	mg/L	1 U	1 U	1 U	1 U	1 U	1 U
Phosphorus, Total	mg/L	0.062	0.0888	0.178	0.0573	0.0877	0.295
Metals and Metalloids							
Selenium, Dissolved	mg/L	0.166	0.018	0.0289	0.179	0.0374	0.0295
Selenium, Total	mg/L	0.161	0.0161	0.026	0.174	0.0365	0.0299

Notes

Results presented are preliminary, and have not been validated at the time of this report.

U - Analyte not detected above the method detection limit (MDL).

J - Result is estimated.

Table 2
Field Water Quality Data

Hoopes Springs Water Treatment Plant Pilot Study
Phase 2, Performance Monitoring

		Parameter >>	Dissolved Oxygen	ORP	pH	SC	Temperature	Turbidity
		Units >>	mg/L	mV	SU	umhos/cm	C	NTU
Station	Sample ID	Date						
Week 90								
Influent	SC1119-LSSHS-IN001	11/6/2019	9.3	149	7.77	493	14.63	0.9
Ultra Filtration Backwash	SC1119-LSSHS-UFB001	11/6/2019	7.4	177	7.56	82	13.72	2.1
Effluent	SC1119-LSSHS-EF001	11/6/2019	9.51	177	7.19	501	13.12	0.8
Week 92								
Influent	SC1119-LSSHS-IN002	11/20/2019	11.01	147	7.15	503	13.69	0.7
Ultra Filtration Backwash	SC1119-LSSHS-UFB002	11/20/2019	650	143	7.76	144	14.23	1.7
Effluent	SC1119-LSSHS-EF002	11/20/2019	11.35	145	7.87	501	13.21	0.7

Notes: